

# **5<sup>th</sup> GSFC-JPL Quality Mission Software Workshop - May 13, 14, 15 2003**

<http://qmsworkshop5.gsfc.nasa.gov/>

## **Sponsored by:**

The Information Systems Division, Code 580, GSFC and  
The Information Technologies and Software Systems Division, Code 360, JPL, and  
The Center for Space Mission Information and Software Systems, JPL

## **Workshop Chairs:**

Mr. John Donohue, Assoc. Br. Hd. Real-Time Software Engineering, Information Systems Division, GSFC  
Mr. Richard Doyle, Manager, Information Technology Program Office, JPL and Leader, Center for Space Mission Information and Software Systems, JPL  
Mr. Sven Grenander, Deputy Leader, Center for Space Mission Information and Software Systems, JPL

**John Donohue, Richard Doyle and Sven Grenander cordially invite you to attend this joint workshop that continues with the series theme of quality mission software. Software and systems engineers for both flight and ground systems, and software quality assurance engineers are encouraged to participate, as well as anyone interested in the challenges of mission software. There will be 5 working sessions and 3 informational sessions. Please see below for session details.**

## **SESSION DESCRIPTIONS**

### **Working Sessions (5)**

#### **1. Science Data Processing Session, Day 1 (Mike Seablom/GSFC, Larry Preheim/JPL)**

NASA's Earth Science Enterprise is actively promoting the coupling of large prediction models that span research themes. Much of the current modeling work is stove-piped into disciplines centered around the oceans, land processes, the troposphere, the stratosphere, etc. In order that the Enterprise goal of 14-day predictive skill be realized it will be necessary to couple models of the entire Earth system. It will be a grand challenge of both science and software engineering to bring the various disciplines together to build such a system.

The Earth Science Technology Office has recently funded researchers to begin building an architecture to accomplish this vision. The Earth System Modeling Framework (ESMF) is a collaborative effort among various research institutions to begin the steps necessary for a complete integration of various models. The framework will require a highly-distributed, data-intensive scientific computing environment. Because the scientists have little experience in building large software systems, presentations related to the various components of the framework will be presented for review by workshop participants. It is expected that the participants will provide recommendations for reducing the overall risk to the effort, and suggestions of future directions for developing and maintaining such large, highly-distributed software systems.

#### **2. Flight Software Engineering Technologies, Day 1 (Glen Cammarata/GSFC, Abdullah Aljabri/JPL)**

Using UML, state charts, and auto-code generation is emerging as a powerful approach to implementing software designs for complex missions. GSFC and JPL have developed flight software that utilizes this new paradigm. Experiences from Deep Space 1, Deep Impact, Microwave Anisotropy Probe, and James Web Space Telescope will be presented.

Proper design validation, which seeks to ensure the correctness of a design at the earliest stage possible, is a major challenge in any software development process. JPL and GSFC will present their model capture and validation techniques.

At JPL, developments in model checking offer a promising solution for applying a powerful validation technique to mission-critical software. By conducting an exhaustive exploration of all possible behaviors of a software system, model checking can detect design defects that are difficult to discover with conventional testing approaches.

At GSFC, JWST Flight Software Executive, currently under development, is utilizing the Rational Unified Process (RUP) with its Rational Rose Real-Time development suite to advance flight software technologies. Training, team development

strategies, software architectures, document generation, requirements tracking, and change management are topics covered.

### **3. Comparison of Reusable Flight Software Components, Day 2 (Jane Marquart/GSFC, Peter Gluck/JPL)**

This session will explore the baseline architectures at JPL and GSFC with a focus on the re-usable aspects of the flight software components. A description of GSFC's layered architecture and common executive software will be presented, detailing the characteristics and issues experienced porting this architecture to other missions. A description of JPL's OS&A/Common C&DH will also be presented. Discussion topics include: problems encountered trying to re-use components and/or complete architectures and what were their causes; what components/functions are common; methods for creating re-usable components.

### **4. Software Process Improvement Session, Day 2 (Sally Godfrey/GSFC, Chi Lin/JPL)**

As a part of the NASA Software Initiative, many of the activities that are performed in producing NASA's software are being examined for possible areas of improvement. During this workshop session, attendees will have an opportunity to contribute to two of the areas where work is beginning—software acquisition, and software assurance. The descriptions of the two agenda topics are below:

**Software Acquisition:** Both JPL and GSFC acquire a significant amount of their software from the contract community. In order to assure that the best possible software results from these acquisitions, the acquiring organizations need good processes for issuing requests for contract proposals, choosing a competent contractor, monitoring the contractor's work and evaluating the resultant products. Both JPL and GSFC will make brief presentations outlining their plans to improve their software acquisition activities.

**Software Assurance:** Software Process Improvement has become commonplace in today's work force as more and more software managers and software practitioners are recognizing the value of improvement initiatives and their impact on software quality. While Software Assurance isn't by any means new, there are changes underway at the Agency and NASA field centers to strengthen the roles of each of the software assurance disciplines. These changes, along with some of the common misconceptions regarding software assurance, will be presented. Attendees will have an opportunity to discuss their expectations of Software Assurance, particularly Software Quality Assurance, and what's working and/or not working at their center. Key software development processes and products will also be discussed in terms of their value to the software development team and the final product.

### **5. Short Topic Presentations, Day 2 Afternoon (Dan Smith/GSFC, Dave Nichols/JPL, Dan Erickson/JPL)**

This session provides the opportunity for many short presentations to be made to highlight the breadth of work being done at JPL and GSFC and to encourage interaction and possible future collaboration amongst those with similar interests. A set schedule will be established with each presenter given 15 minutes plus 5 minutes for questions.

## **Informational Sessions (3) (Plenary)**

1. *NASA Software Initiative - General Overview (John Kelly/NASA HQ)*
2. *Software Management Challenges from a Project Manager's Perspective (Liz Citrin/GSFC, Dan Erikson/JPL)*
3. *High Dependability Computing Program (HDCP) (Mike Lowrey/ARC)*

## **AGENDA/SCHEDULE**

Day 1 - May 13, 2003

Activity		Time	Point of Contact	
Breakfast		7:30 AM - 9:00 AM	Mary Floyd	
Registration		8:30 AM - 9:00 AM	Mary Floyd	
Introduction		9:00 AM - 9:30 AM	John Donohue, Sven Grenander, Rich Doyle	
Informational/Plenary Sessions		9:30 AM - 12:30 PM	John Donohue, Sven Grenander	
Lunch		12:30 PM - 1:30 PM	Mary Floyd	
Working Session #1 Room A	Working Session #2 Room B	1:30 PM - 5:00 PM	#1 - Mike Seablom, Larry Preheim	#2 - Glen Cammarata, Abdullah Aljabri
Break before dinner		5:00 PM - 6:00 PM		
Conference Dinner		6:00 PM - 7:00 PM	Mary Floyd	
Evening Event		7:00 PM	Mary Floyd, John Donohue	

Day 2 - May 14, 2003

Activity		Time	Point of Contact	
Breakfast		7:30 AM - 9:00 AM	Mary Floyd	
Introduction		9:00 AM - 9:30 AM	John Donohue, Rich Doyle	
Working Session #3 Room A	Working Session #4 Room B	9:30 AM - 1:00 PM	#3 – Jane Marquart, Peter Gluck	#4 – Sally Godfrey, Chi Lin
Lunch		1:00 PM - 2:00 PM	Mary Floyd	
Working Session #5 Room A		2:00PM – 5:00PM	Dan Smith, Dave Nichols, Dan Erikson	
Break before dinner		5:00 PM - 6:00 PM		
Conference Dinner		6:00 PM-7:00 PM	Mary Floyd	
Evening Event		7:00 PM	Mary Floyd, John Donohue	

Day 3 - May 15, 2003

Activity		Time	Point of Contact	
Breakfast		7:30 AM - 9:00 AM	Mary Floyd	
Introduction		9:00 AM - 9:15 AM	John Donohue, Sven Grenander, Rich Doyle	
Working Session #1 Report Out		9:15 AM - 9:35 AM	Working Session #1 Co-chairs	
Working Session #2 Report Out		9:35 AM - 9:55 AM	Working Session #2 Co-chairs	
Break		9:55 AM - 10:10 AM		
Working Session #3 Report Out		10:10 AM - 10:30 AM	Working Session #3 Co-chairs	
Working Session #4 Report Out		10:30 AM - 10:50 AM	Working Session #4 Co-chairs	
Working Session #5 Report Out		10:50 AM - 11:10 AM	Working Session #5 Co-chairs	
Discussion of Workshop Metrics and Areas for improvement, Close-out		11:10 AM - 11:30 AM	John Donohue, Sven Grenander, Rich Doyle	

### WORKSHOP LOCATION:

Atlantic Sands Hotel and Conference Center

Ocean Front & Baltimore Avenue

Rehoboth Beach, DE 19971

Phone: 1-800-422-0600, Fax: 302-227-9476 <http://www.atlanticsandshotel.com/>

### REGISTRATION INFORMATION:

Please complete the attached registration form and return to Mary Floyd at [mfloyd@westover-gb.com](mailto:mfloyd@westover-gb.com) or via facsimile at 301-345-4659. There is no registration fee for this conference. Please return this form no later than May 2, 2003.

### HOTEL ACCOMMODATIONS:

A block of sleeping rooms has been reserved at Atlantic Sands under the name "QMS". The rate per night is \$161.00 and the workshop 3-night package includes 3 breakfasts, 3 lunches, and 2 dinners and the total cost is the approved government per diem (hotel and M&IE). This rate does not include room tax (for government travelers, please bring a tax-exempt form). Please call the hotel at 1-800-422-0600 to make your reservation. You must call by **Friday**,

**April 18, 2003** in order to guarantee availability of rooms and rates. After this date, rooms will be available on a rate/space only basis.

**AIR TRAVEL:**

The Atlantic Sands is accessible from the following airports:

Baltimore Washington International – Approximately 2 hours by car.

Salisbury Regional – Approximately 1 hour drive by car. (US Airways and United both have flights connecting through Philadelphia, Pennsylvania to Salisbury, Maryland)

**SHUTTLE:**

Car rental is available at both Salisbury and Baltimore/Washington International airports.

**THINGS TO DO:**

For information on things to do in Rehoboth Beach, go to: <http://www.rehoboth.com>.

Extracurricular events will be put on the QMS website and announced at the workshop.

NOTE: Due to new government regulations, NASA or NASA conference support contractors can no longer collect fees for special events or extracurricular activities that are not directly related to the workshop.

**DIRECTIONS:**

For directions and a map please see <http://www.atlanticsandshotel.com/map.cfm>

**PARKING:**

Parking is free to meeting attendees and overnight guests. Each guest will receive one space.

For questions concerning these logistics, please contact Mary Floyd at [mfloyd@westover-gb.com](mailto:mfloyd@westover-gb.com) or 1-800-634-6326 x107. For questions concerning meeting content please contact John Donohue at [john.t.donohue@nasa.gov](mailto:john.t.donohue@nasa.gov) or 301-286-6149.

# REGISTRATION FORM

## GSFC-JPL Quality Mission Software Workshop - May 2003

Please complete this form and return to Mary A. Floyd, Westover Consultants, Inc., 7833 Walker Drive, Suite 560, Greenbelt, MD, 20770, via facsimile at: 301-345-4659 or by email to mfloyd@westover-gb.com **by May 2, 2003.**

NAME: \_\_\_\_\_

AFFILIATION: \_\_\_\_\_

STREET ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_

PHONE: \_\_\_\_\_ FAX: \_\_\_\_\_

EMAIL: \_\_\_\_\_

**Please indicate which sessions you wish to attend? (Check one per time period):**  
**(Some sessions are held in parallel)**

### Informational Sessions (3)

- |  |                          |
|--|--------------------------|
| 1. NASA Software Initiative - General Overview - Tues., May 13, 9:00AM-10:00AM             | <input type="checkbox"/> |
| 2. Software Mgmt Challenges/Project Manager's Perspective - Tues., May 13, 10:00AM-11:10AM | <input type="checkbox"/> |
| 3. High Dependability Computing Program - Tues., May 13, 11:30AM-12:30PM                   | <input type="checkbox"/> |
|  |                          |
| 1. Science Data Processing Session - Tues., May 13, 1:30PM.                                | <input type="checkbox"/> |
| 2. Flight Software Engineering Technologies - Tues., May 13, 1:30PM.                       | <input type="checkbox"/> |
| 3. Comparison of Reusable Flight Software Components - Wed., May 14, 8:30AM- 12:30PM.      | <input type="checkbox"/> |
| 4. Software Process Improvement Session - Wed., May 14, 8:30AM- 12:30PM.                   | <input type="checkbox"/> |
| 5. Short Topic Presentations - Wed., May 14 1:30PM - 5:00PM.                               | <input type="checkbox"/> |

Do you require any assistance in accordance with Americans with Disabilities Act regulations? If so, explain below.

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